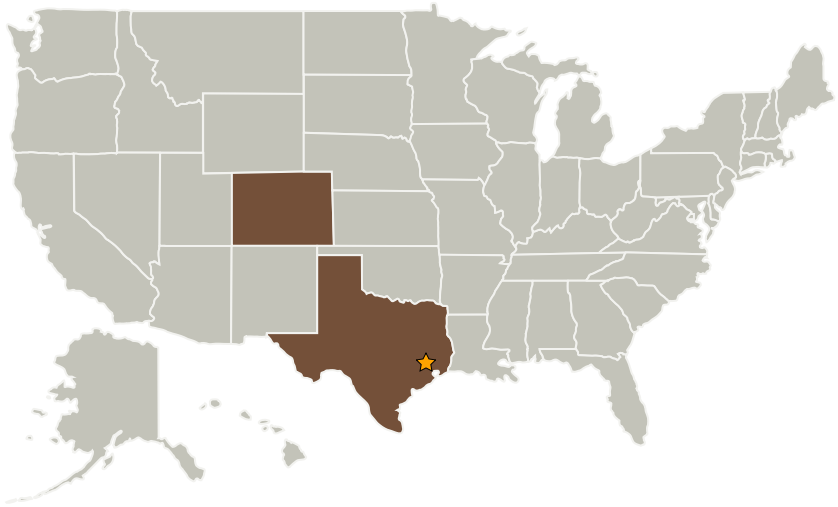
A Compact Medical Oxygen Generator for Spacecraft, Phase I

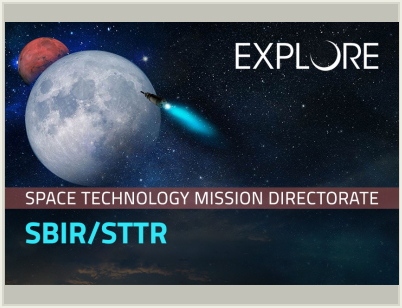
Completed Technology Project (2009 - 2009)

Project Introduction

An on-board oxygen concentrator is required during long duration manned space missions to supply medical oxygen. Commercial medical oxygen generators are pressure swing adsorption (PSA) based systems that use nitrogen selective zeolites and are mostly large, massive, and power intensive. TDA Research, Inc. (TDA) proposes to develop a small, lightweight, portable oxygen generator that uses a high capacity, long life, regenerable oxygen absorbent to produce concentrated medical oxygen from ambient cabin air. TDA's system will have less volume, mass, and power draw than current systems. In Phase I, we will demonstrate the ability of the oxygen concentrator technology to produce greater than 60% oxygen at 6 LPM from ambient cabin air. We will evaluate the sorbent performance in bench-scale experiments and carry out a preliminary design of the unit, determine its weight, volume and energy requirements, and compare them to those of other competing technologies. The technology will be at TRL-3 at end of Phase I. In Phase II, we will fabricate a sub-scale oxygen concentrator prototype with all key components to fully demonstrate the concept and reliable long duration operation. We will optimize cycle duration, stage length etc. The technology will be at TRL-5 at end of Phase II.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
TDA Research, Inc.	Supporting Organization	Industry	Wheat Ridge, Colorado

Primary U.S. Work Locations	
Colorado	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.3 Protective Clothing and Breathing